REMARKS

Claims 1-7, 17-28, and 30 are pending in the present case. Claims 1-7 stand rejected under 35 U.S.C. § 101. Claims 1-7, 17-28, and 30 were rejected under 35 U.S.C. § 112, first paragraph. Claims 18, 20, and 27-28 were rejected under 35 U.S.C. § 112, second paragraph. Claims 1-5, 17-20, 23-26, and 30 were rejected under 35 U.S.C. § 102(b). Each of these rejections is addressed below.

Color Drawings

Applicants have amended the specification to include the paragraph set forth in 37 C.F.R. § 1.84 to indicate that the present application contains at least one color drawing. A petition to accept color drawings is also enclosed. No new matter has been added by this amendment.

Rejections under 35 U.S.C. § 101

Claims 1-7 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Office argues that "infection of nematode by a pathogen does not alter its structure. As such the claims read on a product of nature, which is non-statutory subject matter." Applicants respectfully disagree.

Claim 1 reads:

1. An isolated nematode persistently infected with an isolated pathogen

(emphasis added).

Applicants' specification, at page 6, defines "isolated nematode" as follows:

> By "isolated nematode" is meant a nematode that is purified from contaminating organisms and maintained in a culture. Exemplary nematodes (wild type or mutant), such as *C. elegans*, are obtained from publicly available sources or purified from the environment according to standard methods known in the art.

Also, at page 6, the phrase "isolated pathogen" is defined as follows:

> By "isolated pathogen" is meant a microbial strain that has been cultured, through the actions of man, and that elicits a disease response in a host.

As noted by the Supreme Court in *Diamond v. Chakrabarty*, 447 U.S. 303 (1980), "Congress intended statutory subject matter to "include anything under the sun that is made by man." (citation omitted.) Applicants' claimed nematode therefore plainly qualifies as patentable subject matter. Indeed, the claimed nematodes are manmade, nonnaturally occurring compositions of matter and are patentable subject matter under § 101. This ground of rejection should therefore be withdrawn.

Rejections under 35 U.S.C. § 112, first paragraph

Claims 1-2, 4-7, 17-22, 24-28, and 30 stand rejected, under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to convey to one skilled in the relevant art that the inventors had possession of the claimed invention. More specifically, the Office Action asserts that, "because

applicants have described only *C. elegans* that is persistently infected with a pathogen, it is not clear that applicants were in possession of the invention as broadly claimed." This ground for the rejection is respectfully traversed.

To provide an adequate "written description," applicants need only communicate to those skilled in the art that the claimed subject matter is intended to be part of their invention. As stated by the Federal Circuit in *Martin v. Mayer*, 823 F.2d 500, 3 U.S.P.Q.2d 1333 (Fed. Cir. 1987):

> [T]he specification must 'convey clearly to those skilled in the art to whom it is addressed...the information that [the inventor] has invented the specific subject matter later claimed.'

Moreover, the MPEP § 2163.02 states:

> [A]n objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed (emphasis added).

Applicants have met these standards since the present specification would certainly indicate to one of ordinary skill in the art that virtually any nematode is useful in the invention. Indeed, classification of the thousands of nematode species that have been described is based largely on morphology (e.g., structural features), life history, and habitat. Nematodes are simply roundworms, and are well known to those skilled in the art. Furthermore, if one skilled in the art knows the characteristics of one species of nematode, they also know a considerable amount about other nematodes in the same

taxonomic grouping. Accordingly, a skilled artisan, contrary to the assertion found in the Office action, can, in fact, envision the nematodes encompassed by the scope of applicants' claims and the written description basis for the § 112 rejection should be withdrawn.

Claims 1-5, 17-20, 23-28, and 30 also stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification. In particular, the Office asserts that the specification fails "to provide a description for other pathogens embraced by the claims." This ground for the rejection is respectfully traversed.

With respect to the existence of additional pathogens, applicants direct the Examiner's attention to, for example, page 4, lines 15-23, of the specification, which describes exemplary pathogens useful in the invention. As a result, applicants' specification clearly satisfies the written description requirement, as set forth by the case law, and applicants request reconsideration and withdrawal of this basis for the § 112 rejection.

Claim 26 also stands rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification. Applicants have amended claim 26 to now require "a fragment of an antibody," and this rejection may be withdrawn.

Finally, claims 1-7, 17-28, and 30 stand rejected under 35 U.S.C. § 112, first

paragraph, based on the assertion that the teachings of applicants' specification are not commensurate in scope with the present claims. For the following reasons, applicants respectfully traverse this ground for the rejection.

As an initial matter, applicants note that if one skilled in the art wished to generate the claimed nematodes or practice the claimed methods, they would simply use applicants' disclosed methods. To this end, applicants, in their specification, teach methods useful for generating isolated nematodes persistently infected with an isolated pathogen and using such nematodes for screening for a virulence factor or a compound that inhibits a persistent infection in a nematode. These approaches require only standard application of routine methods as described and exemplified in applicants' specification. Furthermore, given applicants' success using *C. elegans* and *Salmonella* there is no basis for concluding that one skilled in the art, equipped with applicants' disclosure would not be able to utilize other nematodes and pathogens falling within the scope of the present claims.

Furthermore, applicants submit that the invention involves no undue experimentation. As acknowledged by the Office, applicants' specification provides extensive teachings pertaining to *C. elegans* persistently infected with a pathogen. There can be no question that the guidelines provided by the teachings of applicants' disclosure are readily applicable to virtually any nematode and pathogen interaction. One simply cultures a nematode in the presence of a pathogen and then assays for persistent infection.

Such a single-step screening approach cannot constitute undue trial and error experimentation.

Applicants also note that no scientific evidence currently made of record in this case establishes a basis for doubting the objective truth of the statements found in applicants' specification regarding enablement. Moreover, the Examiner has provided no evidence or reason for doubting applicants' statement that other nematodes or pathogens are useful in the invention. (Nothing more that objective enablement is required, and it is irrelevant whether this teaching is provided through broad terminology or illustrative examples. *In re Marzocchi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971)). On this basis, as well, the facts in the present case compel withdrawal of the § 112, first paragraph enablement rejection, and applicants request reconsideration on this issue.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 18, 20, and 27-28 also stand rejected, under 35 U.S.C. § 112, second paragraph on the basis that certain claim terms are indefinite.

In particular, claim 18 was rejected on the grounds that the claim because "it is the expression product of the gene that is detected and not the gene itself." Applicants have amended claim 18 to refer to a "detectable gene product," and this basis for the rejection may be withdrawn.

Claim 20 was rejected for lack of antecedent basis for the phrase "mutated

pathogen." To address this rejection, Applicants have deleted the word "mutated" from the claim.

In addition, claim 27 was rejected for lack of antecedent basis for the phrase "inhibition of pathogenicity." Applicants respectively traverse this ground of rejection, noting that step (c) of claim 17, from which claim 27 depends, refers to "determining whether the test compound inhibits the pathogenicity of said pathogen." Accordingly, applicants submit that claim 17 provides an antecedent basis for claim 27 and this rejection should be withdrawn.

Finally, claim 27 stands further rejected as confusing. To address this rejection, applicants have amended the claim to recite "killing of *C. elegans* by a salmonellae pathogen." This rejection may now be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 1-5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tan et al. (PNAS, 1999, 96:2408-2413). Claims 1-5, 17-20, 23-26, and 30 also stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ausubel et al. (1998, WO 98/50080). The Office bases the rejections on the assertion that "it is inherent that *Pseudomonas* is found in the *C. elegans* intestinal tract." These rejections are respectfully traversed.

Applicants' claims are directed to compositions or methods that require a nematode that is persistently infected with a pathogen. Notably, at pages 5-6 of the

present specification, applicants state:

> By "persistent infection" or "persistently infected" is meant an invasion or colonization of a host animal (e.g., nematode) by a pathogen (e.g., *Salmonella*) that is damaging to the host, where the size of the persistent pathogenic population that are associated with the host after the host has been transferred to a non-infectious environment remains at least 30%, preferably 50%, more preferably 80%, and most preferably 90%, or even 95% to 99% of the size of the pathogenic population before the transfer of the host to a non-infectious environment. Such an infection also includes an increase in the numbers of the pathogenic population that are associated with the host when the host is first exposed to a relatively small number of the pathogen mixed with an excess of non-pathogenic bacteria after which the host is transferred to a non-infectious environment. A persistent infection is typically measured using a nematode feeding assay (as described herein) where bacteria are assayed for their ability to establish a long-lasting association in the worm intestine.

The case law is clear that, to anticipate a claim, a prior art reference must disclose, either expressly or inherently, all of the limitations of the claim. *Kalman v. Kimberley-Clark Corp.*, 713 F.2d 760 (Fed. Cir. 1983). Applying this standard to the present case, there can be no question that the Tan and Ausubel references fail to provide an express teaching of persistently infected nematodes as defined in applicants' specification. Each of these references never explicitly states that *Pseudomonas* persistently infects a nematode, and on this point there does not appear to be any dispute.

Furthermore, as summarized in the recent Federal Circuit decision, *Finnigan Corp. V. ITC*, 51 U.S.P.Q.2d 1001, 1009 (Fed. Cir. 1999) (citing *Continental Can Co., USA v. Monsanto Co.*, 948 F.2d 1264 (Fed. Cir. 1991)) (emphasis added):

> To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.
>
> > *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) (quoting *Hansgirg v. Kemmer*, 102 F.2d 212, 214, 40 USPQ 665, 667 (CCPA 1939)) [states]:
> >
> > Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

Under this standard, the deficiencies in the Tan and Ausubel references are apparent. According to the Office, each teaches "since *C. elegans* feed on *Pseudomonas* it is inherent that *Pseudomonas* is found in the *C. elegans* intestinal tract." The fact that *Pseudomonas* may be found in the intestinal tract of *C. elegans* is not enough to raise these references to the level of an anticipatory reference; this teaching could only inherently disclose the presently claimed invention if the infection is "necessarily" persistent to the exclusion of all other "probabilities or possibilities." The § 102 rejection should therefore be withdrawn.

CONCLUSION

Applicants request reconsideration of the present rejections and allowance of claims 1-7, 17-28, and 30.

Enclosed is a Petition to extend the period for replying to the Office action for three months, to and including September 11, 2003, and a check in payment of the required extension fee. If there are any additional charges or any credits, please apply them to Deposit Account No. 03-2095.

Respectfully submitted,

Date: 11 September 2003

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